REMARKS

Claims 1-2, 9-10, 15-16, 18-21, and 23-36 are pending.

One embodiment of the invention is directed to a method of processing video data to detect field characteristics of the data, and in particular, to detect whether a field is progressive or interlaced. The method includes calculating first and second difference values as differences between pixels of a current field and pixels of a previous field and differences between the pixels of the current field and pixels of a subsequent field, respectively. In contrast to prior art methods, the method determines whether the current field is an interlaced field or a progressive field with respect to the subsequent field based on the first and second difference values.

Claims 1-2, 9-10, 26-27, and 29-30 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,452,011 to Martin et al. ("Martin") in view of U.S. Patent No. 5,561,477 to Polit.

Martin and Polit do not teach or suggest the invention recited in claim 1. Claim 1 recites a method that includes calculating first and second difference values as differences between pixels of a first field and pixels of a previous field (second field) and differences between the pixels of the current field and pixels of a subsequent field (third field), respectively. In addition, the method calculates a ratio between the first and second difference values, compares the ratio with a threshold, and determines whether the first field is an interlaced field or a progressive field based on the calculating and comparing steps.

Martin and Polit not teach or suggest determining whether the first field is an interlaced field or a progressive field based on such calculating and comparing steps. As recognized by the Examiner, Martin does not disclose calculating such a second difference value, or calculating a ratio of such first and second difference values, and thus, Martin cannot suggest determining whether the first field is an interlaced field or a progressive field based on such calculating steps. Polit does not supply the missing suggestion of determining whether the first field is an interlaced field or a progressive field based on such calculating steps because Polit never determines whether any field is interlaced or progressive or suggest any test that relates to whether a field is interlaced or progressive.

The applicants disagree with the Examiner's assertion that Polit teaches calculating the ratio between such difference values <u>in order to get a more accurate measurement of characteristics in a video sequence</u> (citing col. 5, lines 15-30). That section of Polit does not state or imply that the ratio provides a more accurate measurement of characteristics in a video sequence. Instead, Polit merely states that odd and even difference ratios can be used to determine whether image fading has occurred from one frame to another. Nothing in Martin or Polit suggests that any image fading test is relevant to whether a frame is interlaced or progressive. As a result, no one skilled in the art would be motivated to employ an image fading test, like that of Polit, to improve upon Martin's interlaced/progressive test. At best, if one combined Polit with Martin, one would simply use Polit's image fading test to determine whether there is image fading and Martin's test to determined whether a frame is interlaced or progressive.

Accordingly, claim 1 is nonobvious in view of Martin and Polit.

Claims 2, 26, and 29-30 depend on claim 1, and thus, are also not obvious in view of Martin and Polit.

Although the language of claims 9-10 is not identical to that of claims 1-2, the allowability of claims 9-10 will be apparent in view of the above discussion.

Martin and Polit do not teach or suggest the invention recited in claim 27. Claim 27 recites "determining whether said first field is an interlaced field or a progressive field with respect to said third field based on said steps of calculating ..." As discussed above, Martin and Polit do not teach or suggest such a determining step, and thus, claim 27 is nonobvious.

In addition, claim 27 recites "verifying whether a scene-change has occurred before performing said calculating steps." Polit does not mention any scene changes per se. Polit does discuss a test for detecting image fading, which in some situations could amount to a scene change, but does not suggest verifying whether a scene-change has occurred <u>before performing said calculating steps</u>. Instead, Polit performs calculating steps during the image fading/scene change test, and thus, does not suggest the scene change test before the calculating steps..

Martin and Polit do not teach or suggest any of the other features of claim 27 regarding a response to a determination of a scene change. First, claim 27 states that, if the step of verifying reveals that a scene-change has occurred, then the method includes performing a moving pixel detection to determine whether first and second fields are interlaced. Neither Martin nor Polit performs a moving pixel determination.

Given that Martin and Polit do not suggest any moving pixel determination, Martin and Polit cannot suggest the steps of the moving pixel determination recited in claim 27. In particular, claim 27 recites calculating first and second differences respectively between first and third pixels of a first field and a second pixel of a third field. Neither Martin nor Polit suggests comparing two pixels of a first field with the same pixel of another field. Instead, Martin and Polit both compare one pixel of one field with only one pixel of another field.

For the foregoing reasons, claim 27 is nonobvious in view of Martin and Polit.

Claims 15-16, 18-21, 23-25, 28, and 31-36 were rejected under 35 U.S.C. § 103 as being unpatentable over Martin and Polit in view of U.S. Patent No. 4,661,853 to Roeder.

The cited references do not teach or suggest the invention recited in claim 15. Claim 15 recites that calculating the first difference value comprises calculating pixel differences between the pixel of the first field and two pixels of the second field; selecting a smaller pixel difference between the pixel differences; and accumulating the smaller pixel difference. The Examiner admitted that Martin and Polit do not teach those features, but asserted that Roeder does.

The applicants disagree with the Examiner's assertion that Roeder teaches the features of claim 15. Roeder does not teach calculating pixel differences between the pixel of the first field and two pixels of the second field. Figures 1A-1D each show an array of circles with numbers each representing a single pixel difference between one current pixel of one frame or field and one pixel of another frame or field (col. 2, lines 46-68). Nothing in Figures 1A-1D or the accompanying discussion suggests that one pixel of one field or frame is compared to two different pixels of another field or frame.

The Examiner also mistakenly refers to the discussion of Figure 4 in columns 4-5 of Roeder as teaching the steps of claim 23. Figure 4 shows a subtracter 70 that compares an

incoming video signal with a delayed video signal that is delayed by one frame interval. Nothing in the discussion of the subtracter 70 or any other portion of Figure 4 states or implies that the same pixel of one of the video signals is compared to two different pixels of the other video signal.

Even if Roeder had suggested calculating pixel differences between one pixel of the first field and two pixels of the second field, Roeder still would not suggest the invention because Roeder does not suggest selecting the smaller of such pixel differences. Figure 4 of Roeder shows the subtracter 70, an absolute value circuit 72, a comparator 74, a threshold value 76, horizontal line delay elements 84, and several sample-period delay elements 85-104, none of which are configured to select the smaller of two difference values. The only comparing done in Figure 4 is the comparing of each difference value with the threshold value 76 by the comparator 74, but the comparator 74 never compares two difference values to select the smaller one.

For the foregoing reasons, claims 15-16 are nonobvious in view of Martin, Polit, and Roeder.

The cited references do not teach or suggest any of the features of claim 25. Claim 25 recites calculating the number of moving pixels between said second and third fields, wherein the determining step includes determining that said first field is an interlaced field if said number is lower than a moving pixel threshold, and determining that said first and third fields are progressive if said number is not lower than the moving pixel threshold. As with claim 15, the Examiner admits that Martin and Polit do not teach the recited elements of claim 25, but mistakenly asserts that Roeder supplies the missing teaching.

Martin, Polit, and Roeder do not teach or suggest the claimed invention because Roeder does not supply the teachings of the elements of claim 25 that are missing from Martin and Polit. Figures 5-8 of Roeder show various embodiments of logic circuits that can be used to detect motion, but none of the embodiments count moving pixels and compare the moving pixel count to a threshold. Figures 5-6 involve logically ANDing various combinations of binary pixel differences (see col. 2, lines 62-68 for conversion of pixel differences to binary values) and logically Oring the outputs of the AND gates (110-116 or 120-126). Figures 7 and 8 are logic circuits that provide various combinations of pixel difference sign values and magnitude values.

None of the logic gates of Figures 5-8 would provide a count value of the number of moving pixels or compare a count value to a threshold. For example, the AND gate 110 determines whether all of the magnitude inputs 13, 14, 18, 19 are logical ones, but those magnitude inputs are not indications of moving pixels, so the output of the AND gate 110 is not anything representing a count of moving pixels.

For the foregoing reasons, claim 25 is not rendered obvious by the cited prior art.

For the remaining claims, their obviousness will be apparent in view of the above discussion. In particular, although the language of claims 23-24 and 34 is not identical to that of claim 15, the allowability of claims 23-24 and 34 will be apparent in view of the discussion of claim 15. Although the language of claims 18-20 and 31-36 is not identical to that of claim 25, the allowability of claims 18-20 and 31-36 will be apparent in view of the above discussion of claim 25. Although the language of claims 32-33 is not identical to that of claim 1, the allowability of claims 32-33 will be apparent in view of the above discussion of claim 1. Although the language of claims 35-36 is not identical to that of claim 27, the allowability of claims 35-36 will be apparent in view of the above discussion of claim 27.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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